The Effects of Personality upon Breeding Success in Humboldt Penguins (*Spheniscus humboldti*)

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Introduction

Humboldt penguins (*Spheniscus humboldti*) are a vulnerable species commonly kept within UK zoological collections (ZIMS, 2018). However, in captivity, their breeding success is half that of their wild counterparts (Mason, 2010).

Past research has tended to focus on determining optimal breeding conditions (e.g. Blay and Cote, 2001), however personality may also be a determinant of breeding success (Schuett, Dall & Royle, 2011; Martin-Wintle et al, 2017).

The aim of this study was to determine whether personality affects breeding success in captive Humboldt Penguins.

Methods

Study Site and Study Sample: Personality profiles were created for 30 individual Humboldt penguins (15 pairs) housed in the Penguin Beach enclosure at ZSL London zoo. Pairs were randomly chosen from within the colony (n=84).

Personality Assessment: Personality was assessed using keeper questionnaires considering interactions with conspecifics and human-animal interactions, novel object testing (via three separately presented novel objects: bamboo wind chime, glitter ball and an abacus; Figure 1) and behavioural observations. Each individual was observed for a total of two hours over a two-month period via continuous focal sampling.

Reproductive Success Assessment: Breeding success was assessed in terms of number of eggs laid, number of eggs hatched and number of chicks fledged. Data on breeding success were obtained from the Zoological Information Management System (ZIMS) for 2014-2017.

Statistical Analysis: Principal component analysis was used to create personality dimensions, and individuals were rated as high/low on each dimension. Chi square tests were then used to determine if there was an association between each personality dimension and reproductive success.

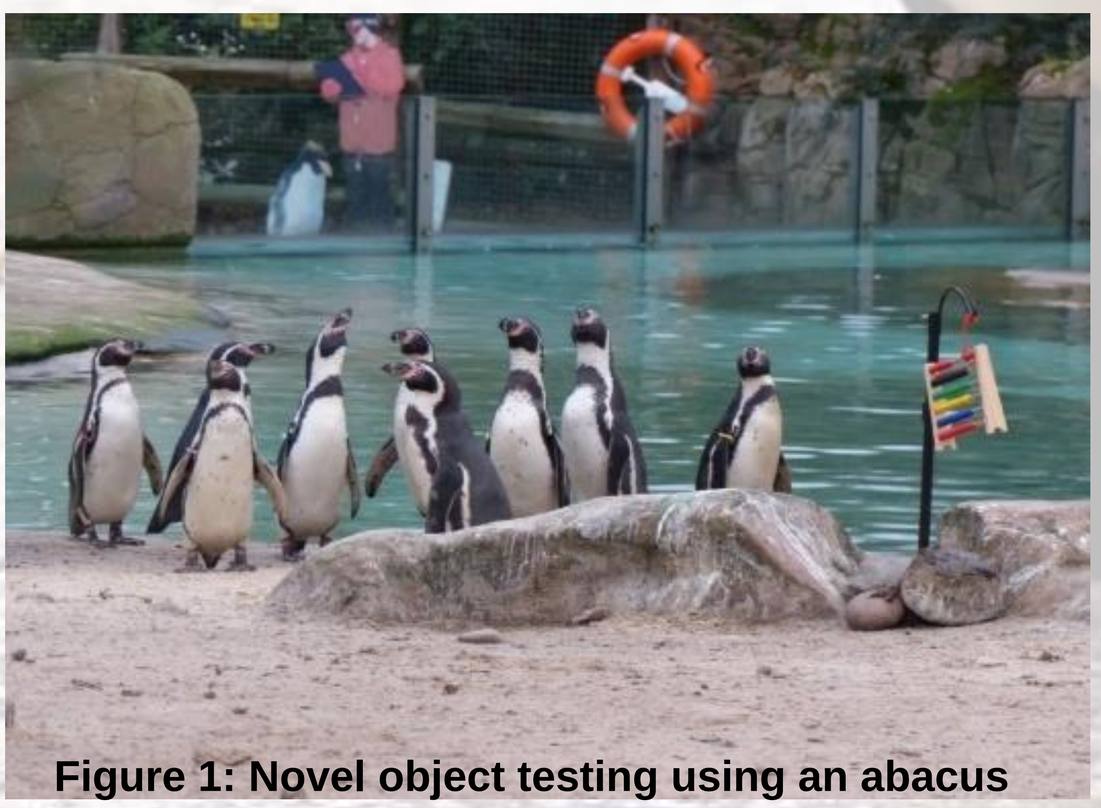

Figure 1: Novel object testing using an abacus

Results

Principal component analysis revealed three components of personality, labelled dominant, sociable and shy toward people, which explained 70.9% of the total variance.

There was a moderately strong association between sociability and reproductive success (Cramer's V = .208, x2(2) = 11.039, p=.004) and a small association between shyness and reproductive success (Cramer's V = .187, x2(2) 8.872, p=.012).

There was no significant association between dominance and reproductive success. Penguins with low sociability and high shyness toward people tended to show greatest reproductive success (Figure 2 and Figure 3).

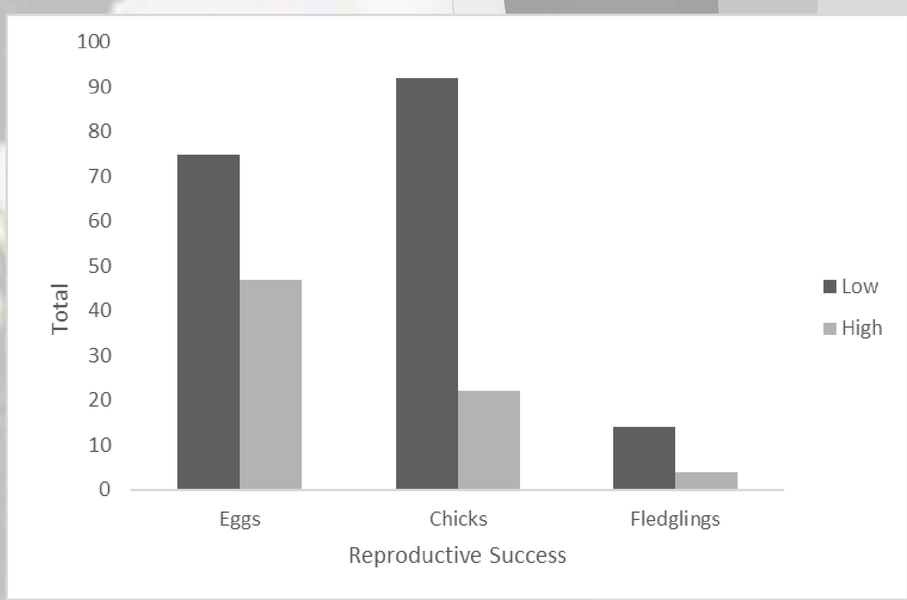

Figure 2: Sociability and reproductive success

Figure 3: Shyness toward people and reproductive success

Discussion

These findings suggest that personality can affect breeding success in Humboldt penguins and is a factor that should be considered in captive breeding programmes. Less sociable penguins with low sociability and penguins that were shy toward people tended to show greatest reproductive success.

This coincides with the wild population where Humboldt penguin nests were more successful when located away from humans (Ellenberg et al, 2006), and where less sociable individuals may better cope with mate-separation during the rearing period (AZA Penguin Taxon Advisory Group, 2014).

Interventions such as providing nest boxes throughout the enclosure and away from public access, as well as reducing keeper disturbance through nest checks may be beneficial in enhancing reproductive success in captive Humboldt penguins.

References

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